

A. Identifying Elements (Isotopes)

Complete the following chart using the periodic chart. Note that examples 1, 2, 3, 7, 8, 9, and 11 are for stable isotopes, and that each of these isotopes have a net charge of 0, i.e. they are not ions. If you are not given a way to determine the mass number, round from the periodic table.

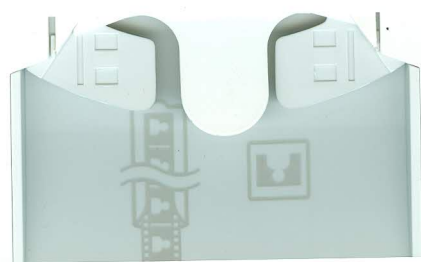
Example #	Element	Atomic #	Atomic weight	# of protons	# of neutrons	# of electrons
1	Al	13	27	13	14	13
2	Zn	30	65	30	35	30
3	Ne	10	20	10	10	10
4	He	2	4	2	2	2
5	Bi	83	210	83	127	83
6	P	15	32	15	17	15
7	Sb	51	122	51	71	51
8	Hg	80	201	80	121	80
9	Ba	56	137	56	81	56
10	U	92	238	92	143	92
11	Au	79	197	79	118	79
12	C	6	14	6	8	6

B. Radioactivity and Transmutation

Complete the following equations and state the type of radiation emitted. Note that the location of the atomic weight is not location that is commonly accepted because of formatting constraints.

Radioactive Isotope _____ Type of Radiation Emitted _____

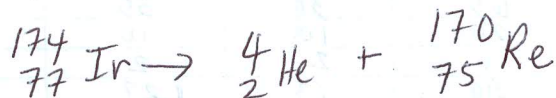
- ${}_{56}^{142}\text{Ba} \rightarrow {}_{57}^{142}\text{La} + {}_{-1}^0\text{e}^0$
- ${}_{58}^{139}\text{Ce} \rightarrow {}_{58}^{139}\text{Ce} + {}_0^0\delta$
- ${}_{99}^{252}\text{Es} \rightarrow {}_{97}^{248}\text{Bk} + {}_2^4\text{He}$
- ${}_{48}^{117}\text{Cd} + {}_2^4\text{He} \rightarrow {}_{50}^{121}\text{Sn} + {}_{-1}^0\text{e}^0$
- ${}_2^6\text{He} \rightarrow {}_3^6\text{Li} + {}_{-1}^0\text{e}^0$
- ${}_{86}^{209}\text{Rn} \rightarrow {}_{87}^{209}\text{Fr} + {}_{-1}^0\text{e}^0$
- ${}_{88}^{226}\text{Ra} + {}_{-1}^0\text{e}^0 \rightarrow {}_{87}^{226}\text{Fr} + {}_0^0\delta$
- ${}_{90}^{231}\text{Th} \rightarrow {}_{91}^{231}\text{Pa} + {}_{-1}^0\text{e}^0 + (\text{energy})$
- ${}_{91}^{230}\text{Pa} \rightarrow {}_{92}^{230}\text{U} + {}_{-1}^0\text{e}^0 + (\text{energy})$
- ${}_{7}^{17}\text{N} + {}_0^0\delta \rightarrow {}_8^{17}\text{O} + {}_{-1}^0\text{e}^0$



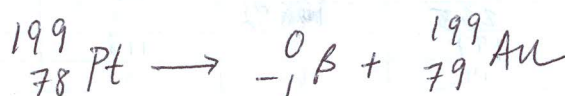
Nuclear Chemistry Practice Sheet

Using your knowledge of nuclear chemistry, write the equations for the following processes:

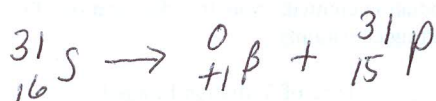
- 1) The alpha decay of iridium-174



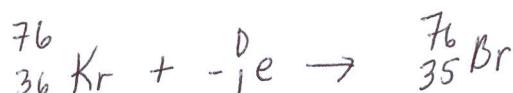
- 2) The beta decay of platinum-199



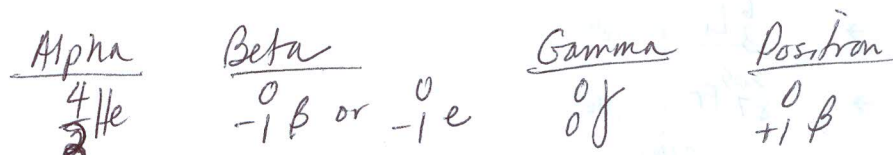
- 3) Positron emission from sulfur-31



- 4) Krypton-76 undergoes electron capture



- 5) Write the symbols for an alpha particle, beta particle, gamma ray, and positron.



- 6) If the half-life for the radioactive decay of zirconium-84 is 26 minutes and I start with a 175 gram sample, how much will be left over after 104 minutes?

$$X = 175\text{g} \left(\frac{1}{2}\right)^{104/26} = 10.9\text{g}$$

- 7) Why is it difficult to make a fusion reaction occur?

You must achieve a temperature of 200 million K

